

VERIFICATION OF TRANSLATION

I, Siglinde Mueller, of Korbinian-Beer-Str. 35, 80997 Munich, Germany, do hereby declare that I am conversant with the English and German languages and that I am a competent translator thereof.

I verify that the attached English translation is a true and correct translation of the priority document of German patent application 103 16 771.4 in the name of Giesecke & Devrient GmbH.

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Security label and method for producing it

[0001] The invention relates to a self-adhesive security label for a data carrier, such as a security document or document of value, with a substrate, to the front of which security features are applied and the back of which is provided with a cold adhesive foil. The invention furthermore relates to a data carrier having such a security label and a method for producing such a security label.

[0002] Data carriers within the terms of the present invention in particular are security documents or documents of value, such as bank notes, passports, identification documents, visa stickers, check forms, share certificates, deeds and the like.

[0003] Such documents often are put through elaborate processes, so as to render the documents to be distinguishable from imitations or forgeries. For this purpose they are provided with security elements, which, on the one hand, are difficult to imitate and, on the other hand, permit the security element to be authenticity-checked by a layman. For example, printed areas produced by intaglio printing are characterized by a tactility that is also easily recognizable for the layman, and which cannot be reproduced by other printing methods, in particular by copying machines or scanners.

[0004] The security elements often are formed as self-adhesive security labels, which are pasted on the security document or document of value by an authorized body, for example a passport authority. The security label can also have the form of stickers or seals which, for instance, serve to secure high-quality products or their packaging.

[0005] From the print DE 27 48 498 A1 a multilayer label for marking objects is known, which in the case of an attempt to detach the label is destroyed or defaced to such an extent that its transfer onto another object is detectable. The label has a flexible transparent plastic foil which on one side comprises a print that comprises information. On its printed side the foil is provided with a pressure-sensitive adhesive layer for applying to an object. The print has a lower adhesiveness to the foil than to the adhesive layer, so that in the case of an attempt to detach the label, at least a part of

the adhesive layer adhering to the surface underneath remains thereon, and at least a part of the print adheres to this adhesive layer.

[0006] The print GB 2 128 581 A discloses a transparent foil with light-transmissive markings printed on one side. On the same side of the foil a pressure-sensitive adhesive is applied, so that it is possible to paste the foil over information to be protected, for example a photograph in a passport. The employed adhesive here is selected such that the attempt to remove the foil will result in an irreparable damage of the surface underneath or of the foil itself.

[0007] On these premises the invention is based on the object to provide a security label that is improved compared to the prior art. In particular, the security label is to allow a use in especially security-relevant products, for example as a biometric label or visa sticker.

[0008] This object is achieved by the security label having the features of the main claim. A data carrier having such a security label and a production method for producing such a security label are subject matter of the independent claims 9 and 11. Developments of the invention are subject matter of the subclaims.

[0009] According to the invention, a security label of the above-mentioned kind comprises an integrated circuit disposed in a recess of the adhesive foil for storing security data and an antenna disposed between substrate and adhesive foil and connected with the integrated circuit for contactless communication with the integrated circuit. The functionality of the self-adhesive security label thus is extended by an electronic memory function, for example for storing biometric data.

[0010] The design according to the invention here allows the intensive processing of the security label in the manufacturing process, without loading the required integrated circuit too high, since this integrated circuit cannot be connected to the antenna via the recess of the adhesive foil until the end of the manufacturing process.

[0011] At the same time the security label of the invention has the advantage that an attempt to detach the security label from a surface it is pasted on, in all probability, will either destroy the antenna itself or detaches the circuit connected with the antenna

from the antenna, so that the communication unit is no longer functioning. In contrast to this, conventional labels equipped with a transponder, which permit a contactless communication with a chip, have a structure that is so sturdy that a non-destructive detachment of the transponder from the label is possible.

[0012] The recess, in the simplest case, is formed circular, but can also be oval, rectangular, star-shaped or can have any desired form which provides sufficient space for incorporating the integrated circuit later.

[0013] The recess with the integrated circuit is preferably closed by a covering element, in particular a self-adhesive covering element. It goes without saying, that the form of the covering element is expediently adjusted to the form of the recess, so as to achieve a complete covering with the help of an overlapping arrangement of cold adhesive foil and covering element.

[0014] According to an expedient development of the invention, the antenna is printed on or embossed into the substrate.

[0015] The front-side security features advantageously have a passport photograph, a finely structured pattern, in particular a guilloche print, machine readable features, such as a machine readable line, fluorescent substances, magnetic or electrically conductive substances, or a multidimensional bar code. Such security features are basically known and therefore are not explained in detail in the following.

[0016] In an especially preferred embodiment the front-side security features of the security label comprise a printed area produced by intaglio printing. In this printed area the substrate surface is partially deformed by the impressing into the printing plate and provided with a relatively thick ink layer. Such a printed area due to its tactility is easily recognizable even for the layman and thus can be used as authenticity feature. While with the conventional designs of security labels the high pressures which occur with intaglio printing inevitably damage a bonded chip, in the security label according to the invention the integrated circuit is not incorporated and connected to the antenna until after the intaglio printing step.

[0017] With the intaglio printing preferably a printed relief is produced in the substrate which has a relief height of 25 µm to 80 µm. Attention has to be paid to the fact, that the relief height achieved as a print result depends on both the engraving depth of the printing plate and on the properties of the substrate material and the printing ink. Furthermore, the relief height is perceived in different manners depending on the individual sensitivity of a user. But in general, a printed relief with a relief amplitude of 50 µm or more leads to distinctly tactile relief structures.

[0018] According to an advantageous development, the front-side security features at least partially are covered with a foil, so as to counteract mechanical and/or chemical loads acting on or signs of wear of the security features. In particular when the front-side security features comprise a printed area produced by intaglio printing, it may be expedient to cover only a part of the intaglio printing area with the foil, and to make available the other part for the purpose of a simple and direct tactile authenticity testing carried out by the user.

[0019] The above-mentioned foil advantageously has a thickness of less than 20 µm, in particular about 6 µm to about 12 µm. Furthermore, for further increasing the security of the label the foil may comprise holographic diffraction structures. As foil materials for example polyethylene terephthalate or various thermoplastics are suitable. In order to not conceal the information that is present therebelow, the foil is preferably transparent or at least translucent. In some applications it may be advantageous, when the foil is colored.

[0020] The substrate of the security label is expediently formed from cotton paper or paper with a mixture of cotton/synthetic fibers.

[0021] The invention also comprises a data carrier, in particular a document of value, such as a bank note, a passport, an identification document, a visa sticker or the like, having a security label as described above. The security label according to the invention may also be applied to a high-quality product or a product packaging.

[0022] The adherence strengths of the cold adhesive foil and the connection between the integrated circuit and the antenna here are adjusted to each other such that a

detachment of the security label from the data carrier leads to a destruction of the antenna or a separation of antenna and integrated circuit.

[0023] A method for producing a self-adhesive security label for a data carrier comprises the procedure steps:

[0024] a) providing a substrate;

[0025] b) applying security features onto a front of the substrate;

[0026] c) applying an antenna arrangement onto a back of the substrate;

[0027] d) applying a cold adhesive foil with a recess in the area of the antenna arrangement onto the back of the substrate which is provided with the antenna arrangement, and

[0028] e) incorporating an integrated circuit into the recess and connecting the integrated circuit with the antenna arrangement.

[0029] The antenna arrangement here advantageously is applied onto the back of the substrate by a screen printing of conductive inks or by hot stamping a conductive foil.

[0030] For protecting the integrated circuit, after the incorporation of the integrated circuit, the recess of the adhesive foil advantageously is closed with a self-adhesive covering element.

[0031] According to an expedient variant of the method, upon the reel-fed application of security features the substrate is provided with a background print by offset printing method. Applying the antenna arrangement and the cold adhesive foil onto the back of the substrate preferably is also effected in a reel-fed fashion.

[0032] In an especially preferred development of the invention, on applying the security features a printed area is produced by intaglio printing. This step is advantageously carried out not until after the application of the antenna arrangement and of the cold adhesive foil and before the incorporation of the integrated circuit in sheet format. In this way pressure loads acting on the integrated circuit during the intaglio printing are avoided.

[0033] Further embodiments and advantages of the invention are explained in the following with reference to the Figures. For clarity's sake the figures do without a true-to-scale and true-to-proportion representation.

[0034] Fig. 1 shows a top view onto a visa sticker according to an embodiment of the invention in schematic representation,

[0035] Fig. 2 shows the back of the visa sticker of Fig. 1 with already bonded integrated circuit, but still unclosed recess in the adhesive foil, and

[0036] Fig. 3 to 6 show four intermediate steps of a method according to the invention for producing a visa sticker, each step with reference to a cross section through a visa sticker as shown in Fig. 2.

[0037] Figures 1 and 2 show a schematic representation of a visa sticker 10 according to an embodiment of the invention. The front of the visa sticker 10 comprises a passport photograph 12 of the owner and further personalized details 14a to 14e in machine readable form, which, *inter alia*, comprise the name 14a of the owner, an identification number 14b, the place of issue 14c and the period of validity of the visa 14d, 14e.

[0038] For producing tactile print patterns, in certain areas 16, 18 of the visa sticker 10 there is printed over the background print 42 with steel engraving. In the embodiment, the country of issue 16 and the writing "VISA" 18 are formed by intaglio printing. In other variants for example the passport photograph 12 can also be provided with a pattern in intaglio printing.

[0039] For protecting the personal data, the front of the visa sticker 10 is additionally laminated with a foil 48 of a thickness of about 10 µm, which has an opening 20 above the area of the writing 18. This permits the writing "VISA" to be easily felt with fingertips. Additionally, diffraction structures not shown in the Figure are embossed into the foil 48 as further security features.

[0040] As shown in Fig. 2, the back of the visa sticker 10 carries a transponder with an integrated circuit 30, which stores for example biometric data of the owner. For contactless communication with the circuit 30, onto the back of the substrate is embossed an antenna 32 made of a conductive foil material.

[0041] Furthermore, the back of the substrate and the antenna 32 are covered with a cold adhesive foil 34, with the help of which the visa sticker 10 can be pasted in a passport. In a contact area of the antenna 32, in which the antenna 32 and the circuit 30 are connected to each other, the cold adhesive foil 34 has a recess 36, in which the circuit 30 is incorporated and bonded to the antenna 32 at the end of the manufacturing process.

[0042] After the integrated circuit 30 has been bonded, the recess 36 is closed with a covering element 38 made of cold adhesive foil. The integrated circuit 30 thus is incorporated not until after the intaglio printing step, during which the visa sticker 10 is subjected to especially high pressures.

[0043] The production of the visa sticker 10 of Fig. 1 and 2 is explained in the following in more detail with reference to the intermediate steps of the process as shown in Fig. 3 to 6. The Figures each show a cross section through a described visa sticker 10.

[0044] At first a substrate 40, in the embodiment it is a paper substrate, is made available. The reel-fed paper substrate 40 is provided with a background print 42 which may comprise various security features, for example a passport photograph 12, a guilloche print, machine readable notes 14a-14e or the like. This situation is shown in Fig. 3.

[0045] Then on the back of the paper substrate 40 is embossed in a reel-fed fashion an antenna 32 made of a suitable conductive foil material. In a variation of the method, the application of the antenna 32 is effected by a screen printing with conductive inks.

[0046] Then, likewise in a reel-fed fashion, an adhesive foil 34 with a not shown covering paper is applied. The adhesive foil 34 has a recess 36 of appropriate size at

that position at which subsequently is bonded the integrated circuit 30, as shown in Fig. 4.

[0047] Now the visa stickers 10 prepared on a reel are cut into sheets and the further processing is effected in sheet format. Then onto the background print 42 in the respective areas 16 and 18 the steel engraving is printed. In these areas the visa sticker then has tactile relief structures with a strong embossing 44 and comparatively thick inking 46, as shown in Fig. 5. After the intaglio printing the integrated circuit 30 is incorporated into the recess 36 and bonded to the antenna 32 at contact points. Then, a functional test of the transponder formed by the antenna 32 and the integrated circuit 30 is effected.

[0048] Then the recess 36 is closed with a suitably formed, in the embodiment round, covering element 38 made of cold adhesive foil.

[0049] In a further step the front of the visa sticker 10 is laminated with a foil 48 comprising diffraction structures. Since the foil 48 reduces the tactile detectability of the steel engraving areas, in the area 18 it has an opening 20 through which the printed relief of the steel engraving is tactile in an unchanged manner. Such a finished visa sticker 10 is shown in Fig. 6 in cross section.

Patent Claims

1. A self-adhesive security label for a data carrier, such as a security document or document of value, having a substrate (40) to the front of which are applied security features (12-18, 42) and the back of which is provided with a cold adhesive foil (34), characterized in that the security label comprises an integrated circuit (30) disposed in a recess (36) of the adhesive foil (34) for storing security data and an antenna (32) disposed between substrate (40) and adhesive foil (34) and connected with the integrated circuit (30) for contactless communication with the integrated circuit (30).
2. The security label according to claim 1, characterized in that the recess (36) with the integrated circuit (30) is closed by a covering element (38), in particular a self-adhesive covering element.
3. The security label according to claim 1 or 2, characterized in that the antenna (32) is printed on or embossed into the substrate (40).
4. The security label according to at least one of claims 1 to 3, characterized in that the front-side security features have a passport photograph (12), a finely structured pattern, in particular a guilloche print, machine readable features, such as a machine readable line (14a-14e), fluorescent substances, magnetic or electrically conductive substances, or a multidimensional bar code.
5. The security label according to at least one of claims 1 to 4, characterized in that the front-side security features comprise a printed area (16, 18) produced by intaglio printing method.
6. The security label according to at least one of claims 1 to 5, characterized in that the front-side security features (12-18, 42) are covered at least partially with a foil (48), the foil (48) preferably having a thickness of less than 20 μm , especially preferably of approx. 6 μm to approx. 12 μm .
7. The security label according to claim 6, characterized in that the foil (48) comprises holographic diffraction structures.

8. The security label according to at least one of claims 1 to 7, characterized in that the substrate (40) is made of cotton paper or paper with a mixture of cotton/synthetic fibers.
9. A data carrier, in particular document of value, such as bank note, passport, identification document, visa sticker or the like, having a security label (10) according to at least one of claims 1 to 8.
10. The data carrier according to claim 9, characterized in that the adherence strengths of the cold adhesive foil (34) and of the connection between the integrated circuit (30) and the antenna (32) are adjusted to each other such that a detachment of the security label (10) from the data carrier leads to a destruction of the antenna (32) or a separation of antenna (32) and integrated circuit (30).
11. A method for producing a self-adhesive security label for a data carrier including the following procedure steps:
 - a) providing a substrate;
 - b) applying security features onto a front of the substrate;
 - c) applying an antenna arrangement onto a back of the substrate;
 - d) applying a cold adhesive foil with a recess in the area of the antenna arrangement onto the back of the substrate which is provided with the antenna arrangement, and
 - e) incorporating an integrated circuit into the recess and connecting the integrated circuit with the antenna arrangement.
12. The method according to claim 11, characterized in that the antenna arrangement is applied by screen printing conductive inks.
13. The method according to claim 11, characterized in that the antenna arrangement is applied by hot stamping a conductive foil onto the back of the substrate.

14. The method according to at least one of claims 11 to 13, characterized in that the recess of the adhesive foil is closed with a self-adhesive covering element after step e).
15. The method according to at least one of claims 11 to 14, characterized in that in step b)
 - b1) the reel-fed substrate is provided with a background print by offset printing method.
16. The method according to at least one of claims 11 to 15, characterized in that the steps c) and d) are effected in a reel-fed fashion.
17. The method according to at least one of claims 11 to 16, characterized in that in step b)
 - b2) a printed area is produced on the substrate by intaglio printing method.
18. The method according to claim 17, characterized in that step b2) is carried out in sheet format after steps c) and d) and before step e).

Abstract

The invention relates to a self-adhesive security label for a data carrier, such as a security document or document of value, having a substrate (40), to the front of which security features (12-18, 42) are applied and the back of which is provided with a cold adhesive foil (34). According to the invention, the security label comprises an integrated circuit (30) disposed in a recess (36) of the adhesive foil (34) for storing security data and an antenna (32) disposed between substrate (40) and adhesive foil (34) and connected with the integrated circuit (30) for contactless communication with the integrated circuit (30).

Figure 2

All paragraphs that were changed in PCT/EP2004/003674 compared to the priority application DE 103 16 771.4 are listed below.

German text	PCT/EP2004/003674	DE 103 16 771.4
page 6, line 5 ff	[0020] The substrate of the security label preferably is made of cotton paper or paper with a mixture of cotton/synthetic fiber. Alternatively, the substrate can be formed of a polymer substrate.	[0020] The substrate of the security label is expediently formed from cotton paper or paper with a mixture of cotton/synthetic fibers.
page 7, line 8 ff	[0029] The antenna arrangement here advantageously is applied to the back of the substrate by <u>ink jet printing</u> or screen printing conductive inks or by hot stamping a conductive foil. <u>The antenna arrangement likewise can be completely applied to the substrate as a metallized foil, which is coated with an adhesive activable by heat, by means of transfer method.</u>	[0029] The antenna arrangement here advantageously is applied onto the back of the substrate <u>by a screen printing</u> of conductive inks or by hot stamping a conductive foil.
page 9, line 11 ff	[0040] As shown in Fig. 2 the back of the visa sticker 10 carries a transponder with an Integrated circuit 30, which stores for example biometric data of the owner. For a contactless communication with the circuit 30 to the back of the substrate is applied an antenna 32 made of a conductive foil material.	[0040] As shown in Fig. 2, the back of the visa sticker 10 carries a transponder with an Integrated circuit 30, which stores for example biometric data of the owner. For contactless communication with the circuit 30 onto the back of the substrate is <u>embossed</u> an antenna 32 made of a conductive foil material.
page 9, line 17 ff	[0041] Furthermore, the back of the substrate and the antenna 32 are covered with a cold adhesive foil 34, with the help of which the visa sticker 10 can be pasted in a passport. In a contact area of the antenna 32, in which the antenna 32 and the circuit 30 are connected to each other, the cold adhesive foil 34 has a recess 36, in which at the end of the manufacturing process the circuit 30 is incorporated and <u>contacted</u> to the antenna 32.	[0041] Furthermore, the back of the substrate and the antenna 32 are covered with a cold adhesive foil 34, with the help of which the visa sticker 10 can be pasted in a passport. In a contact area of the antenna 32, in which the antenna 32 and the circuit 30 are connected to each other, the cold adhesive foil 34 has a recess 36, in which the circuit 30 is incorporated and <u>bonded</u> to the antenna 32 at the end of the manufacturing process.
page 9, line 24 ff	[0042] After having <u>contacted</u> the integrated circuit 30 the recess 36 is closed with a covering element 38 made of cold adhesive foil. Thus the integrated circuit 30 is incorporated after the intaglio printing step, during which the visa sticker 10 is subject to especially high pressures.	[0042] After the integrated circuit 30 has been <u>bonded</u> , the recess 36 is closed with a covering element 38 made of cold adhesive foil. The integrated circuit 30 thus is incorporated not until after the intaglio printing step, during which the visa sticker 10 is subjected to especially high pressures.
page 10, line 12 ff	[0045] Then onto the back of the paper substrate 40 is <u>bonded</u> in a reel-fed fashion an antenna 32 made of a suitable conductive foil material. In a variation of the method the application of the antenna 32 is effected by a screen printing or <u>ink jet printing</u> with conductive inks.	[0045] Then on the back of the paper substrate 40 is <u>embossed</u> in a reel-fed fashion an antenna 32 made of a suitable conductive foil material. In a variation of the method, the application of the antenna 32 is effected <u>by a screen printing</u> with conductive inks.
page 10, line 16 ff	[0046] Then a reel-fed adhesive foil 34 with a not shown covering paper is applied. At the position, at which subsequently is <u>contacted</u> the integrated circuit 30, the adhesive foil 34 has a	[0046] Then, likewise in a reel-fed fashion, an adhesive foil 34 with a not shown covering paper is applied. The adhesive foil 34 has a recess 36 of appropriate size at that position at

	recess 36 of appropriate size, as shown in Fig. 4.	which subsequently is <u>bonded</u> the integrated circuit 30, as shown in Fig. 4.
Claim 3	3. Security label according to claim 1 or 2, characterized in that the antenna (32) is <u>printed on, bonded to or embossed</u> into the substrate (40).	3. The security label according to claim 1 or 2, characterized in that the antenna (32) is <u>printed on or embossed</u> into the substrate (40).
Claim 13	13. Method according to claim 11, characterized in that the antenna arrangement is applied by hot stamping <u>or bonding</u> a conductive foil to the back of the substrate.	13. The method according to claim 11, characterized in that the antenna arrangement is applied <u>by hot stamping</u> a conductive foil onto the back of the substrate.